

# STICKEL ON THE MEASUREMENT AND INTERPRETATION OF FOREST-FIRE WEATHER IN THE WESTERN ADIRONDACKS<sup>1</sup>

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The author summarizes the results of an investigation made jointly at Cranberry Lake, N. Y., by the New York State College of Forestry and the Northeastern Forest Experiment Station.

The study was initiated in the early summer of 1925 and was carried on for a period of seven months annually (April through October) up to and including 1929. The author had three main objectives in view:

(a) To study the relation between forest fire hazard and weather conditions; (b) to determine whether current conditions of hazard can be estimated by means of simple meteorological instrumentation; and (c) to show in a general way the application of such an index of hazard and weather forecast to specific problems of fire control.

The first objective led to an investigation of the influence of the various weather elements on the inflammability of forest fuels, particularly that of the duff layer. Since inflammability and the rate of spread of fire depend largely upon the amount of water present in the combustible materials, duff moisture is an important factor in fire danger. This factor, however, is not observed at weather stations. For this reason, the author has attempted to devise some means of correlating certain weather elements with duff moisture so that meteorologists can estimate and forecast fire hazard by the use of ordinary meteorological instruments only.

After thorough investigation, it was found that the best index of duff moisture content is afforded by the three

factors jointly, air temperature, number of hours since last measurable rainfall, and evaporation per hour. The relationship between these variables was obtained by means of curvilinear multiple correlation, and the resulting equation solved by means of an alinement chart. For observations taken at 2 p. m. the alienation index is 0.499, which means that 49.9 per cent of the variability of duff moisture content is due to factors other than those named. It is unfortunate, from the meteorologist's point of view, that evaporation per hour is such an important factor, because that element also is not observed at weather stations.

An intensive study of duff inflammability was made with different kinds of fire brands. From this investigation the author obtained the following inflammability chart:

Degree of hazard	Surface duff moisture content	Effective fire brands
Extreme.....	Below 6 per cent.....	Cigarettes, locomotive sparks, pipe heels, matches, and camp fires.
High.....	6-10 per cent.....	Locomotive sparks, pipe heels, matches, and camp fires.
Medium.....	11-16 per cent.....	Pipe heels, matches, and camp fires.
Low.....	17-22 per cent.....	Matches and camp fires.
Very low.....	23-29 per cent.....	Camp fires—duff at edges will smolder but not spread much.
Generally safe.....	30 per cent or more.....	None; generally safe from all.

This bulletin contains a wealth of information valuable to the meteorologist who is engaged in fire-weather work.

<sup>1</sup> Bulletin of the New York State College of Forestry at Syracuse University. Technical Publication No. 34.

## BIBLIOGRAPHY

C. FITZHUGH TALMAN, in charge of Library

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